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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/565,879

01/23/2006

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EXAMINER

GOUDREAU, GEORGE A

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

04/17/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/565,879	<b>Applicant(s)</b> TAKAMATSU, NAOYUKI	
	<b>Examiner</b> George A. Goudreau	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4,9-11 and 14-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,9-11 and 14-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

1. This action will not be made final due to the new grounds of rejection.
2. Applicant's arguments with respect to claims of record have been considered but are moot in view of the new ground(s) of rejection.
3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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5. Claims 1-4, 9-11, and 14-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brewer et. al. (6,322,600) further in view of Wenski et. al. (6,530,826), and Matsuo et. al. (JP 2003-200,347).

Brewer et. al. disclose a method for cmp polishing a dielectric layer on the surface of a wafer using a cmp slurry which is comprised of spherical silica abrasive particles with a diameter of (30 nms. –400 nms.). The cmp slurry has a pH of about (9-11.5), and contains about (0.2-9) wt. % of an amine hydroxide (i.e.-an organic base). The amine hydroxide compound may be tetramethylammonium hydroxide. It is also noted that Brewer et al teaches that ammonium hydroxide can be replaced by KOH (column 10, lines 5-19). This is discussed specifically in the abstract; and discussed in general in columns 1-24. This is shown in figures 1-7. Brewer et. al. fails, however, to specifically disclose the following aspects of applicant's claimed invention:

- using  $\text{Na}_2\text{CO}_3$  to adjust the pH of the alkaline cmp slurry solution (with regard to claims 1 and 18),
- the specific collection of excess polishing slurry after the cmp polishing step with the subsequent adjustment of the pH of the collected slurry after it has been added to the cmp slurry storage (i.e.-supply) means;
- the usage of silica particles with an average diameter of 5 to 10 nm (with respect to claim 2) in a cmp slurry solution;
- specific cmp polishing parameters, which are claimed by the applicant; and
- the specific usage of an unwoven type polishing cloth with the specific Asker hardness, which is claimed by the applicant

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Wenski et al teaches a process for surface polishing of a silicon wafer using an alkaline polishing abrasive with  $\text{SiO}_2$  constituents. Wenski et al further teaches that the polishing abrasive comprises 1 to 10% by weight of  $\text{SiO}_2$  in ultra-pure water which is adjusted to a pH in the range of 9 to 12 by adding alkali, for example,  $\text{Na}_2\text{CO}_3$ ,  $\text{K}_2\text{CO}_3$ ,  $\text{NaOH}$ ,  $\text{KOH}$ ,  $\text{NH}_4\text{OH}$  and tetra methyl ammonium hydroxide (column 4, lines 30-34).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use any of the compounds described by Wenski et al in the process of Brewer et al as an art recognized equivalent material that will achieve the same predictable result of adjusting the pH of the polishing solution in the range of 9 to 12.

It is also noted that Wenski et al teaches the use of  $\text{SiO}_2$  particles with diameters of 5-10  $\mu\text{m}$  (column 5, lines 48-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use smaller particle sizes as described by Wenski et al in the process of Brewer et al if it is desire to remove only a small amount (1.5  $\mu\text{m}$ ) silicon from the silicon wafer (column 5, line 28 through column 6, line 18).

Matsuo et. al. teach that it is desirable to recycle, and regenerate spent cmp slurry used to polish a wafer by collecting the excess, spent, cmp slurry, adjusting the pH of the collected cmp slurry, filtering out particles outside a targeted size range, and re-using the regenerated cmp slurry to cmp polish subsequently processed wafers. This is discussed specifically in the abstract; and discussed in general on pages 1-5. This is shown in figures 1-7.

It would have been obvious to one skilled in the art to recycle, and regenerate the excess, spent, cmp slurry in the process which is taught by Brewer et. al. based upon the teachings of Matsuo et. al. that it is desirable to do such. Further, this would desirably provide a means for reducing operating costs by reducing the amount of cmp slurry, which is consumed during the cmp processing runs. It would also desirably provide a means for reducing processing costs by reducing the amount of material, which must be waste, treated for disposal.

It would have been obvious to one skilled in the art to employ an unwoven polishing cloth as the polishing pad in the cmp polishing process, which is taught above, based upon the following. The usage of such a polishing pad is conventional or at least well known in the cmp polishing arts. (The examiner takes official notice in this regard.) Further, this simply represents the usage of an alternative, and at least equivalent means for conducting the cmp polishing process, which is taught above to the specific means, which are taught above.

It would have been prima facie obvious to employ any of a variety of different cmp polishing parameters in the cmp polishing process which is taught above including those which are specifically claimed by the applicant. These are all well-known variables in the plasma etching art, which are known to affect both the rate and the quality of cmp process. Further, the selection of particular values for these variables would not necessitate any undue experimentation, which would have been indicative of unexpected results.

Alternatively, it would have been obvious to one skilled in the art to employ the specific process parameters which are claimed by the applicant in the cmp polishing process which is taught above based upon *In re Aller* as cited below.

Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. ≡ In re Aller, 220 F. 2d 454, 105 USPQ 233, 235 (CCPA).

Further, all of the specific process parameters, which are claimed by the applicant, are results affective variables whose value are known to affect both the rate, and the quality of the cmp polishing process.

6. Any inquiry concerning this communication should be directed to examiner George A. Goudreau at telephone number 571-272-1434.

/George A. Goudreau/

Primary Examiner, Art Unit 1792